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Gehad Galal

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EXAMINER

ZHE, MENG YAO

ART UNIT

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2195

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/813,896	Applicant(s) GALAL ET AL.	
	Examiner MENG YAO ZHE	Art Unit 2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-24 are presented for examination.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- A. The following claim languages are unclear and indefinite:

- i) Claim 1, line 2, it is uncertain what a control flag is <i.e. what does it do? Can it be a message? A pointer to a thread? What is it?>.

Claims 6, 12, 17 have the same deficiencies as claim 1 above.

- ii) Claim 9, it is uncertain what the difference is between “a shadow location” and a guest virtual machine <i.e. if the shadow location is in the guest virtual machine, then the writing of the control flag will always go to the virtual machine regardless of whether the flag is owned by the guest virtual machine or not. Are there two separate memory locations within the guest VM such that the flag is written to one of them, which is the shadow

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location, if the flag is not owned by the VM, and to a second location if it is owned by the VM? However, as one can see, the flag will always go to the VM regardless of the ownership. The claim is confusing and unclear.>

Moreover, it is uncertain what is meant by the processor and what it includes <i.e. if the applicant wishes the processor to be the entire system as shown in applicant's Fig 3 drawing, then it makes sense that this processor includes the shadow location and the processor control register. If the processor is meant to be the CPU only, then the specification does not support the claim that the processor contains the shadow location>

Claims 12, 22 have the same deficiencies as claim 9 above.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 6, 12, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett et al, Pub No. US 2004/0117532 (hereafter Bennett) in view of Lange et al, Patent No. 4,298,935 (hereafter Lange).

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6. Bennett was cited in the previous office action.

7. As per claims 1, 12, 17, Bennett teaches a method for writing a control flag by the guest virtual machine, the method comprising: determining whether the processor control flag is owned by a guest virtual machine (Abstract; Para 26); writing the control flag to a processor control register if the control flag is owned by the guest virtual machine (Para 28: wherever the interrupt got delivered to in the guest software corresponds to the control register owned by the guest virtual machine); and writing the control flag to a shadow location in a guest virtual machine context in a memory coupled to the processor if the control flag is not owned by the guest virtual machine (Para 48: wherever the interrupt gets delivered to in the VMM corresponds to the shadow location.).

Bennett does not specifically teach that the control flag is included in a processor control register of a processor.

However, Lange teaches that control flag may specifically included as part of the register in a processor (Column 6, lines 1-15) for the purpose of CPU maintenance.

It would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Bennett with the specifics that the control flag is included in a process, as taught by Lange, because it allows for CPU maintenance.

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8. Claims 1, 6, 7, 12, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Donovan et al., Patent No. 7,251,815 (hereafter Donovan) in view of Lange et al, Patent No. 4,298,935 (hereafter Lange).

9. Donovan was cited in the previous office action.

10. As per claims 1, 12, 17, Donovan teaches a method for writing a control flag, the method comprising: determining whether the control flag is owned by a guest virtual machine (Column 5, line 65-Column 6, line 2); writing the control flag to a processor control register if the control flag is owned by the guest virtual machine (Column 5, lines 43-46; Column 5, line 65-Column 6, line 2); and writing the control flag to a shadow location if the control flag is not owned by the guest virtual machine (Column 5, lines 35-41: the shared work queue corresponds to the shadow location).

Donovan does not specifically teach that the control flag is included in a processor control register of a processor.

However, Lange teaches that control flag may specifically included as part of the register in a processor (Column 6, lines 1-15) for the purpose of CPU maintenance.

It would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Donovan with the specifics that the control flag is included in a process, as taught by Lange, because it allows for CPU maintenance.

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11. As per claim 6, Donovan teaches a method for reading a control flag, the method comprising: determining whether the control flag is maintained in a shadow location; reading the control flag from the shadow location if the control flag is maintained in the shadow location; and reading the control flag from a processor control register if the control flag is not maintained in the shadow location (Column 6, lines 20-30: fetching work from either the semi-dedicated work queue or the shared work queue corresponds to reading from either the processor control register or the shadow location respectively).

12. As per claim 7, The method of claim 6, wherein determining whether the control flag is maintained in a shadow location further comprises determining whether the control flag is owned by the guest virtual machine (Column 5, line 65-Column 6, line 2).

13. Claims 2, 8, 9, 13, 18, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Donovan et al., Patent No. 7,251,815 (hereafter Donovan) in view of Lange et al, Patent No. 4,298,935 (hereafter Lange) further in view of Khalil et al., Patent No. 7,218,634 (hereafter Khalil).

14. Khalil was cited in the previous office action.

15. As per claims 2, 8, 9, 13, 18, 22, Donovan teaches a processor comprising: a processor control register to include a control flag (Column 5, lines 27-31); a pointer to a guest virtual machine context (Column 4, lines 22-25); determining whether the control flag is owned by a guest virtual machine associated with the guest virtual machine

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context (Column 5, line 65-Column 6, line 3); a shadow location in the guest virtual machine context (Column 5, line 41); an execution control unit to cause a write of the control flag by the guest virtual machine to be redirected to the shadow location if the control flag is not owned by the guest virtual machine (Column 5, lines 35-41).

Donovan does not specifically teach a first mask word in the guest virtual machine context, the first mask word to include a first flag to indicate whether the flag is owned by the guest virtual machine.

However, Khalil teaches a method that uses a mask word to determine who the receiver of a message is suppose to go to for the purpose of ensuring correct communication pathway between sender and receiver (Column 7, lines 1-10).

It would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Donovan with a method that uses a mask word to determine who the receiver of a message is suppose to go to, as taught by Khalil, such that the mask may be used to determine where the flag should go to in this specific case, because it helps to ensure correct communication pathway between sender and receiver.

16. Claims 3-4, 14-15, 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Donovan et al., Patent No. 7,251,815 (hereafter Donovan) in view of Lange et al, Patent No. 4,298,935 (hereafter Lange) further in view of Bugnion et al., Patent No. 6,944,699 (hereafter Bugnion).

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17. Bugnion was cited in the previous office action.

18. As per claims 3, 14, 19, Donovan teaches determining whether the control flag is maintained in the shadow location; writing the control flag to the shadow location if the control flag is not owned by the guest virtual machine and is maintained in the shadow location (Column 5, line 65-Column 6, line 3);

Donovan in view of Lange does not specifically teach exiting to a virtual machine monitor if the control flag is not owned by the guest virtual machine and is not maintained in the shadow location.

However, Bugnion teaches exiting to a virtual machine monitor if the control flag is not owned by the guest virtual machine for the purpose of letting the VMM handle flags that the guest virtual machine cannot handle (Column 6, lines 25-37).

It would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Donovan in view of Lange with exiting to a virtual machine monitor if the control flag is not owned by the guest virtual machine, as taught by Bugnion, because it lets the VMM handle flags that the guest virtual machine cannot handle.

19. As per claims 4, 15, 20, Donovan teaches wherein determining whether the control flag is maintained in a shadow location is performed only if the control flag is not owned by the guest virtual machine (Column 5, line 65-Column 6, line 3).

20. Claims 5, 10, 11, 16, 21, 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Donovan et al., Patent No. 7,251,815 (hereafter Donovan) in view of Lange et al, Patent No. 4,298,935 (hereafter Lange) further in view of Khalil et al., Patent No. 7,218,634 (hereafter Khalil) in view of Bugnion et al., Patent No. 6,944,699 (hereafter Bugnion).

21. As per claims 10, 23, Donovan in view of Lange further in view of Khalil does not specifically teach an exit to a virtual machine monitor if the control flag is not owned by the guest virtual machine and is not maintained in the shadow location.

However, Bugnion teaches exiting to a virtual machine monitor if the control flag is not owned by the guest virtual machine for the purpose of letting the VMM handle flags that the guest virtual machine cannot handle (Column 6, lines 25-37).

It would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Donovan with exiting to a virtual machine monitor if the control flag is not owned by the guest virtual machine, as taught by Bugnion, because it lets the VMM handle flags that the guest virtual machine cannot handle.

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22. As per claims 5, 11, 16, 21, 24, Khalil teaches using different flags to indicate who the proper receiver of a message should be (Column 7, lines 1-10). It would have been obvious to one having ordinary skill in the art to use as many flags as needed according to the number of different receivers such that a system can properly use these flags to determine where the message should go to such that wherein the execution control unit is responsive to the second flag only if the first flag indicates that the control flag is not owned by the guest virtual machine, because this allows for proper communication between entities.

Response to Arguments

23. Applicant's arguments filed on 3/4/2009 have been fully considered but are not persuasive.

24. In the remark, the applicant argued that:

- i) Pg 15, claim 9 is clearly written and has no 112 issues, because the claim clearly states two separate locations where the write of the flag goes to, namely the physical register and the shadow location.
- ii) Bennett does not anticipate claims 1, 12, 17 because Bennett teaches that the interrupt control indicator cannot be modified by the VMs and that receiving an interrupt is different from writing a flag value.

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iii) Donovan does not teach determining whether the control flag is owned by the guest virtual machine and where the control flag goes based on this determination.

iv) Khalil is not a proper combination with Donovan.

25. The Examiner respectfully disagrees with the applicant. As to point:

i) The claim never stated what happens when the guest virtual machine does own the control flag. All that it addresses is that under the circumstance that the guest machine does not own the control flag, it goes to the shadow location. Moreover, the applicant never stated if the processor control register may or may not be included as part of the virtual machine context, or that it may or may not be included in the shadow location itself. All the applicant states is that there is a processor that contains the processor control register, and a shadow location. So while both these objects are in the processor, the relationship between these two objects is unclear. One could very well be the subset of another.

ii) Bennett's interrupt control indicator is different from the interrupt. Since the applicant never stated specifically what the control flag is, the Examiner has mapped it to the interrupt, which is a type of flag itself. Furthermore, it is inherent that when an entity receives a message/flag, that message/flag is being written to a type of memory. Receiving means that some signal s being transmitted from the sender to the receiver. So in order to receive properly, that signal has got to be written to a memory, otherwise, the signal will never reach a destination point.

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- iii) Because, as stated in the 112 section above, that it is unclear what the control flag is, the Examiner broadly interpreted this as any entity that gets passed to different memory areas based on the entity's property. Donovan teaches that a pointer to a work item, hence the flag, gets passed to a queue that belongs to a VM (which corresponds to the shadow location) because this work item belongs to that VM (Column 5, line 60-Column 6, line 5). Otherwise, the work item gets passed to the shared work queue, which corresponds to the processor control register (Column 35-45). The applicant is not specific as to what the processor control register is <i.e. is it a register that controls a processor or a processor that contains this register?> and how the processor control register, shadow location are related (see point (i) above and 112 rejection).
- iv) Kahlil teaches the basic idea of using a mask word to determine who the receiver of a message is suppose to go to. It is not the specifics of what these messages are that is used to combine with Donovan. Only this basic idea of Kahlil, when combine with Donovan results in a the mask may be used to determine where the flag of Donovan should go to because it helps to ensure correct communication pathway between sender and receiver.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MENGYAO ZHE whose telephone number is (571)272-

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6946. The examiner can normally be reached on Monday Through Friday, 7:30 - 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Li B. Zhen/
Primary Examiner, Art Unit 2194